STEM Scale-Up Program

Menu for 2016-2017

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GOVERNOR'S STEM ADVISORY COUNCIL

2016-2017 STEM Scale-Up Program Menu

Curriculum for Agricultural Science Education (CASE) – Introduction to Agriculture, Food and Natural Resources

2016-2017 STEM Scale-Up Program

Overview: CASE™ utilizes science inquiry for lesson foundation, and concepts are taught using activity-, project- and problem-based instructional strategies. In addition to the curriculum aspect of CASE™, the project ensures quality teaching by providing extensive professional development for teachers that leads to certification.

Grade Levels: 9-12

Program Summary

Introduction to Agriculture, Food, and Natural Resources (AFNR) introduces students to the range of agricultural opportunities and the pathways of study they may pursue. Science, mathematics, reading and writing components are woven in the context of agriculture, and students will use the introductory skills and knowledge developed in this course throughout the CASE™ curriculum.

Program Objectives and Description

Student experiences will involve the study of communication, the science of agriculture, plants, animals, natural resources and agricultural mechanics. While surveying the opportunities available in agriculture and natural resources, students will learn to solve problems, conduct research, analyze data, work in teams, and take responsibility for their work, actions and learning. For example, students will work in groups to determine the efficiency and environmental impacts of fuel sources in a practical learning exercise.

What does the program provide to the educator?

- CASE™ Curriculum – 172 rigorous lessons that have been cross-walked to national content standards for math, science, English and agriculture with built-in pedagogical/instructional strategies for differentiated instruction.
- Professional Development Training Institute
    - Two week training held during the summer
    - Lodging
    - Most meals
    - All institute material expenses
- Materials/Equipment to implement CASE™
- Workshops at NAAE Conference
- Access to NAAE Communities of Practice (Professional Learning Communities) on the state and regional level
- Teachers services including purchasing lists, technology support and professional development
- Purposeful assessment of the concepts taught

What is required by the educator in order to implement this program?

- Attend two weeks of CASE™ Curriculum Institute (Institute dates and locations will vary based on module requested)
- Commit to adopt and teach CASE™ curriculum upon return from institute (2017-2018 school year)
- Travel expenses above the grant stipend
- Secure equipment and supplies to teach CASE™ course above the award allocation

Website (with link to Standards Alignment): http://www.case4learning.com/index.php/curriculum/case-courses/introduction-to-afnr and http://www.case4learning.com/images/documents/CASE_Brochure_-_AFNR.pdf

Program Video: https://www.youtube.com/watch?v=YNGvaj_fztA

Curriculum for Agricultural Science Education (CASE) - Natural Resources and Ecology

2016-2017 STEM Scale-Up Program

Overview: CASE™ utilizes science inquiry for lesson foundation, and concepts are taught using activity-, project- and problem-base instructional strategies. In addition to the curriculum aspect of CASE™, the project ensures quality teaching by providing extensive professional development for teachers that leads to certification.

Grade Levels: 9-12

Program Summary

Natural Resources and Ecology course is a foundation course within the CASE™ sequence of courses. The course provides students a variety of experiences that are in the fields of natural resources and ecology. Science, mathematics, reading and writing components are woven in the context of agriculture, and students will use the introductory skills and knowledge developed in this course throughout the CASE™ curriculum.

Program Objectives and Description

Students will explore hands-on projects and activities while studying topics such as land use, water quality, stewardship and environmental agencies. Study of the natural world including biomes, land, air, water, energy, use and care, as well as a focus on issues surrounding man's interaction with the Earth, will be addressed in this course. Students will select an ecosystem to study throughout the course and apply principles of natural resources and ecology from each unit of study to that ecosystem.

What does the program provide to the educator?

- CASE™ Curriculum – 172 rigorous lessons that have been cross-walked to national content standards for math, science, English and agriculture with built in pedagogical/instructional strategies for differentiated instruction.
- Professional Development Training Institute
    - Two week training held during the summer
    - Lodging
    - Most meals
    - All institute material expenses
- Materials/Equipment to implement CASE™
- Workshops at NAAE Conference
- Access to NAAE Communities of Practice (Professional Learning Communities) on the state and regional level
- Teachers Services including purchasing lists, technology support and professional development
- Purposeful assessment of the concepts taught

What is required by the educator in order to implement this program?

- Attend two weeks of CASE™ Curriculum Institute (Institute dates and locations will vary based on module requested)
- Commit to adopt and teach CASE™ curriculum upon return from institute (2017-2018 school year)
- Travel expenses above the grant stipend
- Secure equipment and supplies to teach CASE™ course above the award allocation

Website (with link to Standards Alignment): http://www.case4learning.com/index.php/curriculum/case-courses/natural-resources-and-ecology and http://www.case4learning.com/images/documents/CASE_Brochure_-_NRE.pdf

Program Video: https://www.youtube.com/watch?v=YNGvaj_fztA

Engineering is Elementary (EiE)

2016-2017 STEM Scale-Up Program

Overview: Engineering is Elementary (EiE) is a rigorously researched, classroom-tested curriculum that increases students' interest in and confidence about engineering. EiE is designed to encourage all children—including those from underrepresented groups—to envision themselves as potential engineers. The EiE Curriculum is the nation's leading engineering curriculum for grades 1-6.

Grade Levels: 1-6

Program Summary

The EiE curriculum has been expressly designed to address the critical need of increasing children's STEM literacy. Inquiry-based and standards-driven, EiE teaches engineering content and skills, links engineering to the science and mathematics students are already learning, and helps children develop positive associations with engineering and science—to see them as being integral to modern life, and also potential career paths. Besides promoting STEM literacy, EiE units also connect with literacy and social studies.

Program Objectives and Description

The EiE curriculum is expressly designed to:

- Foster science and engineering learning and technological literacy;
- Help all students, but especially girls, minorities, and other underrepresented groups, recognize their ability to engineer;
- Build enthusiasm for engineering as a career choice;

The EiE curriculum integrates engineering with science and improves student understanding of technology. Though people tend to think of science, engineering and technology as three separate things, they're actually closely connected. Because the EiE Project serves young children, it has a simple Engineering Design Process (EDP) to guide students through the engineering design challenges. This EDP has just five steps and uses terms children can understand.

What does the program provide to the educator?

EiE's 20 units present fun, engaging engineering challenges that allow students to apply science knowledge in meaningful ways. Materials kits with supplies for 30 students are provided for each unit. Each unit is introduced by a storybook about a child who solves a problem through engineering. Set in locations around the world, the storybooks integrate literacy and social studies and provide context and meaning for the hands-on activities that follow. In addition to introducing students to the excitement of engineering, EiE fosters valuable cognitive skills such as critical thinking, collaboration, communication, creativity, flexibility, persistence and learning from failure. Educators see the EiE materials as an excellent fit for elementary school students and most often cite as strengths the hands-on approach, the sound pedagogical design of the units, the ease with which they can be adapted to fit local circumstances, the collaborative nature of the activities and the many ways in which using the EiE units promote a greater awareness of the ubiquity of engineering in the lives of their students.

EiE's "Engineering Adventures" and "Engineering Everywhere" are available and especially created for out-of-school programs. "Engineering Adventure" offers real-world engineering challenges, which promote creativity and teamwork. In "Engineering Everywhere," kids engineer a better world with engaging activities that relate to real-world experiences.

What is required by the educator in order to implement this program?

Grant Wood AEA requires the applicant to attend a one-day Professional Development training related to EiE. EiE's "Everyone Engineers" workshop introduces you to the concepts of engineering and technology and prepares applicants to facilitate EiE unit(s) with their students. Educators who experience EiE's professional development feel more prepared to teach engineering, technology, and problem solving.

Website (with link to Standards Alignment): EIE website [http://www.eie.org/]; Connections to Standards and Curricula [http://www.eie.org/eie-curriculum/eie-connects-standards]

Program Video: https://vimeo.com/eieboston/review/129435399/b9261b33d3

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FIRST Robotics Competition

2016-2017 STEM Scale-Up Program

Overview: Combining the excitement of sport with the rigors of science and technology. *FIRST* Robotics Competition is often called the ultimate "Sport for the Mind."

Grade Levels: 9-12

Program Summary

High school students call it "the hardest fun you'll ever have." Under strict rules, limited resources and an intense, six-week time limit, teams of 10 or more students are challenged to raise funds, design a team "brand," hone teamwork skills and build and program industrial-size robots to play a difficult field game against like-minded competitors. It is as close to real-world engineering as a student can get. Volunteer professional mentors lend their time and talents to guide each team. Each season ends with an exciting *FIRST* Championship.

Program Objectives and Description

- Involve more students in this real-world engineering challenge
- Increase partnerships between schools and local community businesses. Students benefit from working next to and learning from professionals. Communities benefit with employees mentoring students to develop a future workforce with essential STEM and teamwork skills
- Develop students' STEM and teamwork skills by working in a team, creating a business plan, communicating with stakeholders and designing, constructing, wiring and programming a robot
- Provide an opportunity to directly apply classroom STEM learning in a real-world setting
- Form teams during the fall with the official season kicked off by a January release of the new robot game. Teams have six weeks to design and build their robot followed by regional competitions in March and April.

What does the program provide to the educator?

- Funding of $6,000 to register their team. With registration, the team is provided with a kit of parts to build a basic competition robot
- A $2,000 stipend for the coach to cover their expenses and time for the training workshop
- Training workshop to teach essential robot programming and design concepts, team organization principles, build season planning suggestions and competition planning suggestions
- On-going support provided by *FIRST*, *FIRST* Senior Mentors, the Iowa *FIRST* Assistant Regional Director and veteran *FIRST* teams

What is required by the educator in order to implement this program?

- Arrange additional team mentor(s)
- Recruit a minimum of 10 student team members
- Arrange a location for the team to use for meetings and building their robot
- Attend a three-day training session in August 2016
- Arrange community partners and sponsors to cover additional costs to build a robot
- Register their team for and compete in at least one regional *FIRST* Robotics Competition Event

Website (with link to Standards Alignment): http://www.firstinspires.org/node/5551

Program Video: https://www.youtube.com/watch?v=hcS7M4sY0fQ

HyperStream

2016-2017 STEM Scale-Up Program

Overview: HyperStream exposes students to technology through hands-on technology projects, competitions, showcases and engaging presentations all combined with the opportunity to work with technology mentors. HyperStream clubs can meet after school or be added into the curriculum.

Grade Levels: 5-12

Program Summary:

To help develop Iowa's future IT workforce, HyperStream connects 5th- to 12th-grade students with industry professionals who expose the students to potential IT careers within Iowa, as well as mentor the students as they complete IT-Related curriculum and projects. The program provides students with access to technology-based education and real-world experiences. HyperStream focuses on five learning tracks rooted in computer science: (Multimedia, Game Design, Cyber Defense, Application Development and Robotics)

Program Objectives and Description:

- To raise awareness of technology careers in all industries across Iowa
- Provide students with the tools and resources to create technology and solve real world challenges
- Provide a program that aligns with 21st century skills, including problem-solving, innovation, teamwork, collaboration, initiative, leadership, adaptability and effective communication
- Increase student participation in post-secondary technology programs including, engineering, computer science and computer engineering

What does the program provide to the educator?

- Project learning modules, curriculum and kits for HyperStream tracks
- Program and curriculum training for educators, including an educator stipend for time and travel ($170)
- Project mentoring/coaching by technology mentors
- Field trip opportunities and potential internships or scholarships for students
- Travel stipend ($250 per club) to attend HyperStream competitions or tech-related events
- HyperStream competition in Ames in late April for students in grades 9-12 and spring virtual competition for students in grades 5-8
- Marketing materials for applicants including t-shirts, posters and brochures to promote the program to students and parents

What is required by the educator in order to implement this program?

- HyperStream is offered **FREE** to applicants.
- Applicants must provide an environment with access to computers for project implementation, as well as utilize the provided software.
- Minimum of one educator to serve as liaison and Teacher Champion that will provide communications with HyperStream staff including registrations, student rosters and surveys.
- Applicants are responsible for recruiting students into the program and attending mandatory training.
- Teacher Champion is responsible for attending HyperStream meetings to facilitate the program.
- Teacher Champion(s) attend student competitions/showcases and coordinate travel plans and expenses beyond $250 travel stipend provided.
- Applicants will be responsible to work in partnership with HyperStream staff in seeking and/or solidifying technology mentors from their local community.
- HyperStream runs from September to May. HyperStream meetings are held at least twice a month.

Website (with link to Standards Alignment): www.hyperstream.org
Program Video: https://www.youtube.com/watch?v=EtpEY_PbRLY

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Making STEM Connections

2016-2017 STEM Scale-Up Program

Overview: The Science Center of Iowa's *Making STEM Connections* program provides a kit, including tools, teacher resources and lessons to inspire the "makers mentality" in youth ages 5-14 through highly engaging, interactive and safe experiences. Building upon the natural inclination to tinker, this program empowers participants to explore STEM principles and 21st Century Skills as they design, create and make.

Grade Levels: K-8 (Ages 5-14)

Program Summary

The *Making STEM Connections* program is designed to empower teachers to cultivate engaging, purposeful and successful extensions of their already developed curriculum. The making philosophy directs students to use their hands in conjunction with their minds to produce meaningful learning outcomes. Educating teachers on the process of making as well as familiarizing them with the tools and materials to be used will be the cornerstone of the *Making STEM Connections* professional development. A classroom using the *Making STEM Connections* kit might have students learning how to fuse plastics to create textiles or making an art-bot using a DC motor and batteries. Educators receive a curricular framework to develop STEM principles and enhance those already existing in their classroom using maker materials and skills.

This curriculum framework is focused around the idea that making and tinkering are ways to engage student's mind and build conceptual understanding around academic content. *Making STEM Connections* is structurally supported by cross-curricular experiences and opportunities, including literacy and math, to reinforce the makers foundation of active learning and problem solving.

The purpose of making as a learning technique is summed up by Dale Dougherty, Chairman of Maker Education Initiative, "It is the difference between a child who is directed to perform a task and one who is self-directed to figure out what to do."

Program Objectives and Description

- Ignite student interest in STEM by helping them discover science in the world around them through interactive, hands-on activities
- Provide educators with foundational tools to develop a Maker's space in their classroom
- Support educators implementation through professional development, technical manuals, reference materials and curricula

What does the program provide to the educator?

- Educational materials including lesson prompts, educator resources and books for instruction and inspiration
- Makers toolbox with a variety materials to support a classroom of 30, such as a GoPro Camera, robotics components, MaKey MaKey, circuit materials, DC Motors, hand tools, soldering iron, sewing machine, safety goggles and first aid kit
- Literature for student engagement and understanding
- Professional Development, led by a master teacher and maker, focused on the making process and research behind its success

What is required by the educator in order to implement this program?

Awardees must participate in a full day of professional development. This experience includes an overview of making, strategies for inspiring the makers mentality, training for tool use and safety and a walkthrough of each lesson prompt.

Website (with link to Standards Alignment): http://www.sciowa.org/makingstemconnections

Program Video (temporary video—official link coming soon): https://youtu.be/S8inqhb68gc

PowerTeaching Math

2016-2017 STEM Scale-Up Program

Overview: Developed by Johns Hopkins Researchers, PowerTeaching Math is the leader in cooperative learning mathematics instruction helping teachers transform their classrooms environments to engage ALL students.

Grade Levels: 6-8

Program Summary

Developed by Johns Hopkins Researchers, PowerTeaching Math (PTM) is the leader in cooperative learning mathematics instruction helping teachers transform their classrooms environments to engage ALL students. PowerTeaching Math provides teachers with the tools necessary to enhance their mathematics instruction and to grow professionally. It prepares students for the rigorous demands of high school so they will continue to succeed and feel confident in their math abilities.

Program Objectives and Description

PTM uses a research-proven cooperative structure to help teachers create a learning environment in which students support each other's learning through discussion of challenges and errors, on-the-spot explanations and motivation to contribute to the success of the team. In several independent studies, students participating in the program gained a full year more than students in a randomized comparison group and had a greater liking of math and higher self-concept in math. PTM's cooperative learning structure teaches students to think critically and problem solve, communicate efficiently and collaborate effectively with their peers. Well-implemented cooperative learning environments provide teachers with the freedom to observe, interact and assess where the students are and allows them to adapt lessons and add targeted instruction as needed in real time.

Through PTM, middle school teachers will provide their students with a "toolbox" of resources they can apply to any challenge they face in high school and beyond. These skills are not only critical for success in math but for success in all STEM fields. No student gets left behind, everyone stays on task, and each student is held accountable for his or her own learning. PTM provides teachers the means to prepare tomorrow's leaders.

What does the program provide to the educator?

A set of teacher and student materials grades 6 through 8 and Algebra I (teacher materials include scope and sequence)	Online access to lessons and social networking with other Power Teacher Mathematics teachers in your building
Ongoing student assessment for each cycle	A flash drive that includes all lessons for each grade level
One registration and travel stipend for New Leaders Institute held in Baltimore, Maryland, July 18-21, 2016	Award winning media clips for concept learning

What is required by the educator in order to implement this program?

Apply for STEM Scale-Up award by March 1, 2016	On-site support visits throughout the school year* **Number of days depends on number of teachers implementing the program per location*
Attend Regional Program Introduction prior to start of school	

Website (with link to Standards Alignment):
http://www.successforall.org/SuccessForAll/media/PDFs/PTM_IowaCCAlignment_2015_final.pdf

Program Videos: https://www.youtube.com/watch?v=6NrmOgTAoJQ &
https://www.youtube.com/watch?v=_YumRKjd4_g&feature=youtu.be

Frequently Asked Question: http://1drv.ms/20bbd2f

Project Lead The Way (PLTW) – Introduction to Computer Science (ICS)

2016-2017 STEM Scale-Up Program

Overview: Funding will assist Iowa high schools in implementing or expanding upon the PLTW Introduction to Computer Science (ICS) course. Awardees are expected to send at least one educator to PLTW ICS Core Training–for which tuition, meals and lodging are allowable expenses, as well as the PLTW Computer Science participation fee and any required ICS equipment and supplies—including Android tablets and computers (laptop or desktop).

Grade Levels: 9-12

Program Summary

Project Lead The Way (PLTW) is a nonprofit organization providing transformative learning experiences for K-12 students and teachers across the U.S. PLTW empowers students to develop in-demand, transportable knowledge and skills through K-12 program pathways that include PLTW Launch (K-5), PLTW Gateway (6-8), and high school programs: PLTW Biomedical Science, PLTW Engineering and PLTW Computer Science. PLTW's teacher training and ongoing support mechanisms allows teachers to engage their students in real-world learning in schools in all 50 states and the District of Columbia.

Program Objectives and Description

Designed for students who have never programmed before, ICS is an optional starting point for the PLTW Computer Science program. Students work in teams to create apps for mobile devices using MIT App Inventor®. They explore the impact of computing in society and build skills in digital citizenship and cybersecurity. Beyond learning the fundamentals of programming, students build computational thinking skills by applying computer science to collaboration tools, modeling and simulation and data analysis. In addition, students transfer the understanding of programming gained in App Inventor to text-based programming in Python® and apply their knowledge to create algorithms for games of chance and strategy.

What does the program provide to the educator?

Selected schools will be granted a $12,000 award to help support the implementation of a new, or expansion of an existing, PLTW ICS course. Allowable expenses include: PLTW Computer Science participation fee ($2,000), tuition, meals and lodging expenses for the one-week PLTW ICS Core Training (~$1700 per teacher) and any ICS equipment and supplies from the PLTW Computer Science Inventory Workbook, including Android tablets and computers. Once schools have registered and have signed the standard award agreement, PLTW will disburse payment beginning in July 2016.

What is required by the educator in order to implement this program?

- Review the Register for PLTW webpage and select a District Administrator (DA).
- If not already registered, DA begins registration for the school district and/or participating schools by completing the online registration form. PLTW will then contact the DA with further instructions. *Registration does not commit the school district to PLTW implementation.*
- Review the PLTW agreement (*coming soon*) with the school board, superintendent, and legal department to ensure all parties are aware of district and school responsibilities.
- Execute LEA Agreement with PLTW and submit W-9 to PLTW as a requirement of the Scale-Up.
- Select a teacher to instruct the PLTW ICS course and add teacher to PLTW database. Teachers should be excited to teach a project-based curriculum and meet the requirements of the PLTW agreement.
- Once added to database, register teacher for PLTW ICS Core Training hosted at the The University of Iowa College of Engineering or Iowa State University College of Engineering by July 1, 2016. Teachers must successfully complete all required online PLTW ICS Readiness Training modules prior to attending Core Training, of which they must successfully complete and pass.
- Purchase necessary equipment and supplies, including Android tablets and computers from the PLTW Computer Science ICS Purchasing Manual.
- Each awarded school will be required to: **Roster all PLTW students**, **offer End of Course Assessments** and **Submit end of calendar year reporting**, including submission of receipts and full allocation of funds for allowable expenses.

Standards Alignment: PLTW Computer Science: ICS Standards Alignment
Program Video: PLTW Overview: https://www.youtube.com/watch?v=al65aeTBKNE

Project Lead The Way (PLTW) – Principles of Biomedical Science (PBS)

2016-2017 STEM Scale-Up Program

Overview: Funding will assist Iowa high schools in implementing or expanding upon the PLTW Principles of Biomedical Science (PBS) course. Awardees will be expected to send at least one educator to PLTW PBS Core Training–for which tuition, meals and lodging are allowable expenses, as well as any required PBS equipment and supplies and the PLTW Biomedical Science participation fee.

Grade Levels: 9-12

Program Summary

Project Lead The Way (PLTW) is a nonprofit organization providing transformative learning experiences for K-12 students and teachers across the U.S. PLTW empowers students to develop in-demand, transportable knowledge and skills through K-12 program pathways that include PLTW Launch (K-5), PLTW Gateway (6-8), and high school programs: PLTW Biomedical Science, PLTW Engineering and PLTW Computer Science. PLTW's teacher training and ongoing support mechanisms allows teachers to engage their students in real-world learning in schools in all 50 states and the District of Columbia.

Program Objectives and Description

In the PLTW PBS course, students explore concepts of biology and medicine to determine factors that led to the death of a fictional person. While investigating the case, students examine autopsy reports, investigate medical history, and explore medical treatments that might have prolonged the person's life. The activities and projects introduce students to human physiology, basic biology, medicine and research processes while allowing them to design their own experiments to solve problems.

What does the program provide to the educator?

Selected schools will be granted a $12,000 award to help support the implementation of a new, or expansion of an existing, PLTW PBS course. Allowable expenses include: PLTW Biomedical Science participation fee ($2,000), tuition, meals and lodging expenses for the two-week PLTW PBS Core Training (~$3,400 per teacher) and any PBS equipment and supplies from the PLTW Biomedical Science Inventory Workbook. Once schools have registered and have signed the standard award agreement, PLTW will disburse payment beginning in July 2016.

What is required by the educator in order to implement this program?

- Review the Register for PLTW webpage and select a District Administrator (DA).
- If not already registered, DA begins registration for the school district and/or participating schools by completing the online registration form. PLTW will then contact the DA with further instructions. *Registration does not commit the school district to PLTW implementation.*
- Review the PLTW agreement (*coming soon*) with the school board, superintendent and legal department to ensure all parties are aware of district and school responsibilities.
- Execute LEA Agreement with PLTW and submit W-9 to PLTW as a requirement of the STEM Scale-Up Program.
- Select a teacher to instruct the PLTW PBS course and add teacher to PLTW database. Teachers should be excited to teach a project-based curriculum and meet the requirements of the PLTW agreement.
- Once added to database, register teacher for PBS Core Training hosted at The University of Iowa College of Engineering or Iowa State University College of Engineering by July 1, 2016. Teachers must successfully complete all required online PLTW PBS Readiness Training modules prior to attending Core Training, of which they must successfully complete and pass.
- Purchase necessary equipment and supplies from the PLTW Biomedical Science Inventory Workbook.
- Each awarded school will be required to: **Roster all PLTW students**, **offer End of Course Assessments** and **Submit end of calendar year reporting**, including submission of receipts and full allocation of funds for allowable expenses.

Standards Alignment: Standards alignment frameworks for PLTW Biomedical Science: Principles of Biomedical Science (PBS) are available at: https://www2.pltw.org/l/82012/2015-10-05/blj2y/82012/20830/PBS_StandardsbyStandards.pdf

Program Video: PLTW Biomedical Science: https://www.youtube.com/watch?v=HnYj6-PEolA

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Science Education for Public Understanding (SEPUP) – *Science and Global Issues: Biology*

2016-2017 STEM Scale-Up Program

Overview: *Science and Global Issues: Biology* is a research-based high school biology course (and individual biology units) developed by the Science Education for Public Understanding (SEPUP) team at the Lawrence Hall of Science at University of California Berkeley. It has a proven record of engaging students in scientific Inquiry and STEM and has been field-tested nationally and in Iowa.

Grade Levels: 9-12

Program Summary

SEPUP program units support the development of core science content and the practices of science and engineering through a variety of hands-on learning activities. Issues related to global sustainability in the life sciences serve as themes for the core ideas in the NGSS and provide continuity and thematic connections in each unit. The program features high quality hands on materials and support for the development of scientific and language literacy, and a nationally recognized, rubric driven assessment system. Every SEPUP unit uses personal and societal issues, such as global threats to human health, sustainable agriculture/ecosystem management and maintaining biodiversity and more, to provide thematic continuity and motivation for student investigations. Applicants can apply for an award and can select from the following four unit options to meet their needs: Ecology, Cell Biology, Genetics or Sustainability/Evolution.

Program Objectives and Description

With development support from the National Science Foundation, SEPUP's *SGI Biology* primary goals are to increase student engagement, motivation and learning in biology and to provide teachers with the support needed. *SGI Biology* engages students in a hands on, inquiry based model as students work in small collaborative groups to learn core science concepts, collect, analyze and apply scientific evidence to the real world issues.

What does the program provide to the educator?

A classroom set of student books for all selected units	Online access to the student book for all students
Complete unit specific materials package with equipment and consumables (including live material coupons) to support up to 5 non-concurrent sections of up to 32 students	Initial implementation and ongoing professional development opportunities with optional quarterly webinars offered
Choice of up to $100 travel stipend or $100 materials credit through Lab-aids	Online portal with all teacher and student resources in one convenient, easy to navigate location
Optional one time $100 materials credit for teachers who cultivate business partnerships directly relating to the overarching issue of the unit	Electronic assessment test bank generator and editable presentation slides for every activity

What is required by the educator in order to implement this program?

Apply for the scale up award by March 1, 2016	Computers to complete 2-3 simulation activities
Attend a one day unit professional development workshop prior to implementation of the program	Access to very few basic not supplied items such as beakers, microscopes and a few perishable items

Website (with link to Standards Alignment): http://lab-aids.com/assets/images/content/correlations/NGSS_BIO_2013_v3-0.pdf
Program Video: Unit specific overviews with PD can be found at http://lab-aids.com/professional-development/resources/training-videos/category/sgi
Note: A temporary link to the SGI Biology teacher portal http://ebooks.lab-aids.com/teacher-resources (user name: iowastem password: biology)

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Spatial-Temporal (ST) Math

2016-2017 STEM Scale-Up Program

Overview: Through our instructional software's uniquely visual, non-language approach to teaching math, students across the country are deeply understanding math, developing perseverance and problem-solving skills, and becoming life-long learners prepared for success.

Grade Levels: K-6

Program Summary

Spatial-Temporal (ST) Math® is the leader in visual math instruction and represents the highest quality and most effective blended learning math solution in K-12 education. Created by the social benefit organization MIND Research Institute, ST Math is game-based instructional software for K-12, offered as a whole-class instructional supplement and designed to boost math comprehension and proficiency through visual learning. Integrating with classroom instruction, ST Math incorporates the latest research in learning and the brain to promote mastery-based learning and mathematical understanding.

When teachers bring ST Math into the classroom, the software games help students make connections between the visual representations from ST Math and symbolic representations found in their core instruction. The ST Math software, comprised of over 300 math games with thousands of math puzzles, allows students to engage in a personalized, self-paced learning path through Iowa state standards-aligned math objectives. A recent analysis conducted by MIND Research showed that Iowa students in grades using ST Math grew on average 6.6 points in the percentage of students scoring at Satisfactory or Advanced on the ITBS, as compared to a drop in Satisfactory/Advanced of 1.2 points for a comparable group of non-ST Math students in Iowa schools.

Program Objectives and Description

- To ensure that all students are mathematically equipped to solve the world's most challenging problems;
- To utilize cutting-edge research in learning and neuroscience to inform continual improvement of programming;
- To provide students with the opportunity to strengthen neural connections as they learn new concepts, immersing students in richly interactive, hands-on learning;
- To provide educators with meaningful, effective technology resource to engage their students and provide rigorous content; And, to provide Iowa students with a program that has a track record of success.

What does the program provide to the educator?

The Annual Single-Student Subscription allows schools to purchase access to the full ST Math content (K-6) for a desired number of students at that site. There is a $4,200 flat fee for up to 145 student licenses per school site. For schools licensing more than 145 students the subscription rate is $29 per student. Licensing includes: Access to ST Math software at school site and updates; Consultation with MIND to generate a plan for successful and timely implementation; Thorough professional development provided to teachers and administrators for start-up; Post-start-up training and professional development modules, including video and scheduled live webinars, to improve program knowledge, use and outcomes; ST Math Digital Training Manuals; Monthly summary progress reports at school/district-level; yearly data review meeting to set goals; Real-time class/school/individual-level reports, indicating level of math standards mastery and RTI growth; Service and technical support via e-mail, phone, or online chat; and a suite of online support resources.

What is required by the educator in order to implement this program?

ST Math is a cloud-based resource that can be accessed from any Internet-connected computer or tablet. Recommended implementation time for students is 90 minutes per week (60 minutes for K-1). All teachers using ST Math attend professional development either in-person or online prior to implementing to ensure all parties are comfortable, prepared, and supported in their usage of ST Math.

Website (with link to Standards): http://www.mindresearch.org/stmath/standards/
Program Videos:
Demo Games: http://mindresearch.org/play/
Interactive Introduction to ST Math: http://learn.stmath.com/courses/c01/
Founder's TEDx Talk: https://www.youtube.com/watch?v=2VLje8QRrwg